

Appl. No. 10/663,416
Reply to Final Office Action of 12/27/2007

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A composition comprising:

- a) an acid component selected from the group consisting of 1) a sulfuric acid, 2) a fluorosulfonic acid, 3) a perhaloalkylsulfonic acid, 4) an ionic liquid, 5) mixtures of Bronsted acids and Lewis acids, and 6) combinations of any two or more thereof; and
- b) a polymer holding the acid component in place in the composition.

Claim 2 (original): A composition in accordance with claim 1 wherein said polymer is a polyacrylate having a formula of $[-\text{CH}_2-\text{CH}(\text{CO}_2\text{R})-]_n$ where R is a Group IA element.

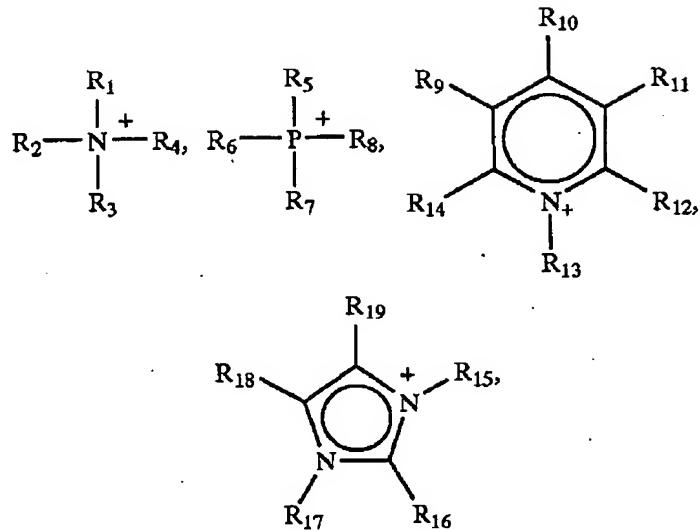
Claim 3 (original): A composition in accordance with claim 2, wherein said Group IA element is hydrogen.

Claim 4 (original): A composition in accordance with claim 1 wherein said acid component is trifluoromethanesulfonic acid.

Claim 5 (original): A composition in accordance with claim 1 wherein said ionic liquid comprises a cation and an anion; wherein said cation is selected from the group consisting of ions defined by the formulas:

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and combinations of any two or more thereof, wherein:

R₁, R₂, R₃, R₅, R₆ and R₇ are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule;

R₄, R₈, R₉, R₁₀, R₁₁, R₁₂, R₁₃, R₁₄, R₁₅, R₁₆, R₁₇, R₁₈, and R₁₉ are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule, and hydrogen; and

wherein said anion is selected from the group consisting of halides of: Group IIIA metals, copper, zinc, iron and phosphorus.

Claim 6 (original): A composition in accordance with claim 1 wherein said mixtures of Bronsted acids and Lewis acids comprise a Bronsted acid selected from the group consisting of hydrofluoric acid, sulfuric acid, trifluoromethane sulfonic acid, and combinations of any two or more thereof.

Claim 7 (original): A composition in accordance with claim 1 wherein said acid component is present in said composition in a range of from about 5 weight percent to about 90 weight percent based on the total weight of said composition.

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Claim 8 (original): A composition in accordance with claim 1 wherein said acid component is present in said composition in a range of from about 30 weight percent to about 85 weight percent based on the total weight of said composition.

Claim 9 (original): A composition in accordance with claim 1 wherein said acid component is present in said composition in a range of from about 50 weight percent to about 80 weight percent based on the total weight of said composition.

Claim 10 (withdrawn): A method for making a composition, said method comprising the step of:

admixing an acid component selected from the group consisting of 1) sulfuric acid, 2) a fluorosulfonic acid, 3) a perhaloalkylsulfonic acid, 4) an ionic liquid, 5) mixtures of Bronsted acids and Lewis acids, and 6) combinations of any two or more thereof and a polymer, to form a mixture thereof.

Claim 11 (withdrawn): A method in accordance with claim 10 wherein said polymer is a polyacrylate having a formula of $[-\text{CH}_2-\text{CH}(\text{CO}_2\text{R})-]_n$ where R is a Group IA element.

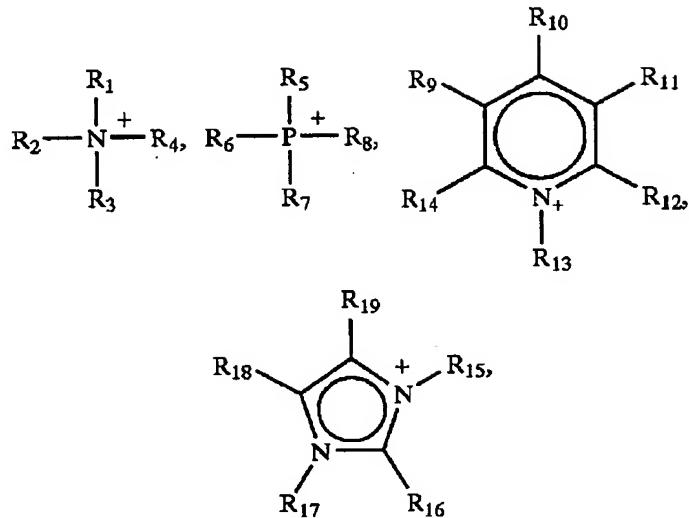
Claim 12 (withdrawn): A method in accordance with claim 11 wherein said Group IA element is hydrogen.

Claim 13 (withdrawn): A method in accordance with claim 10 wherein said base component is trifluoromethanesulfonic acid.

Claim 14 (withdrawn): A method in accordance with claim 10 wherein said ionic liquid comprises a cation and an anion; wherein said cation is selected from the group consisting of ions defined by the formulas:

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and combinations of any two or more thereof, wherein:

R₁, R₂, R₅, R₆ and R₇ are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule;

R₄, R₈, R₉, R₁₀, R₁₁, R₁₂, R₁₃, R₁₄, R₁₅, R₁₆, R₁₇, R₁₈, and R₁₉ are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule, and hydrogen; and

wherein said anion is selected from the group consisting of halides of:
Group IIIA metals, copper, zinc, iron and phosphorus.

Claim 15 (withdrawn): A method in accordance with claim 10 wherein said mixtures of Bronsted acids and Lewis acids comprise a Bronsted acid selected from the group consisting of hydrofluoric acid, sulfuric acid, trifluoromethane sulfonic acid, and combinations of any two or more thereof.

Claim 16 (withdrawn): A method in accordance with claim 10 wherein said acid component is present in said composition in a range of from about 5 weight percent to about 90 weight percent based on the total weight of said composition.

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Claim 17 (withdrawn): A method in accordance with claim 10 wherein said acid component is present in said composition in a range of from about 30 weight percent to about 85 weight percent based on the total weight of said composition.

Claim 18 (withdrawn): A method in accordance with claim 10 wherein said acid component is present in said composition in a range of from about 50 weight percent to about 80 weight percent based on the total weight of said composition.

Claim 19 (withdrawn): A process comprising contacting under suitable alkylation reaction conditions a hydrocarbon mixture comprising olefins and paraffins with a composition prepared by the method of claim 10.

Claim 20 (withdrawn): A process in accordance with claim 19 wherein said base component is selected from the group consisting of 1) a sulfuric acid, 2) a fluorosulfonic acid, 3) a perhaloalkylsulfonic acid, 4) an ionic liquid, 5) Bronsted acid and Lewis acid mixtures and 6) combinations of any two or more thereof.

Claim 21 (withdrawn): A process in accordance with claim 20 wherein said base component is trifluoromethanesulfonic acid.

Claim 22 (withdrawn): A process in accordance with claim 19 wherein said polymer is a polyacrylate having a formula of $[-\text{CH}_2-\text{CH}(\text{CO}_2\text{R})-]_n$ where R is a Group IA element.

Claim 23 (withdrawn): A process in accordance with claim 22 wherein said Group IA element is hydrogen.

Claim 24 (withdrawn): A process in accordance with claim 19 wherein said base component is present in said composition in an amount in the range of from about 5 to about 90 weight percent of the total weight of said composition.

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Claim 25 (withdrawn): A process in accordance with claim 19 wherein said base component is present in said composition in an amount in the range of from about 30 to about 85 weight percent of the total weight of said composition.

Claim 26 (withdrawn): A process in accordance with claim 19 wherein said base component is present in said composition in an amount in the range of from about 50 to about 80 weight percent of the total weight of said composition.

Claim 27 (withdrawn): A process in accordance with claim 19 wherein the alkylation reaction temperature is in the range of from about 5°C to about 150°C and the alkylation reaction pressure is in the range of from about ambient pressure to about 50 atmospheres.

Claim 28 (withdrawn): A process in accordance with claim 19 wherein the molar ratio of paraffin to olefin in said hydrocarbon mixture is in the range of from about 2 to 1 to about 25 to 1.

Claim 29 (withdrawn): A process in accordance with claim 19 wherein said olefins are mono-olefins having from 2 to 12 carbon atoms, and wherein said paraffins are isoparaffins having from 4 to 8 carbon atoms.

Claim 30 (currently amended): A composition consisting of:

- a) an acid component selected from the group consisting of 1) a sulfuric acid, 2) a fluorosulfonic acid, 3) a perhaloalkylsulfonic acid, 4) an ionic liquid, 5) mixtures of Bronsted acids and Lewis acids, and 6) combinations of any two or more thereof; and
- b) a polymer holding the acid component in place in the composition.

Claim 31 (previously added): A composition in accordance with claim 30 wherein said polymer is a polyacrylate having a formula of $[-\text{CH}_2-\text{CH}(\text{CO}_2\text{R})-]_n$ where R is a Group IA element.

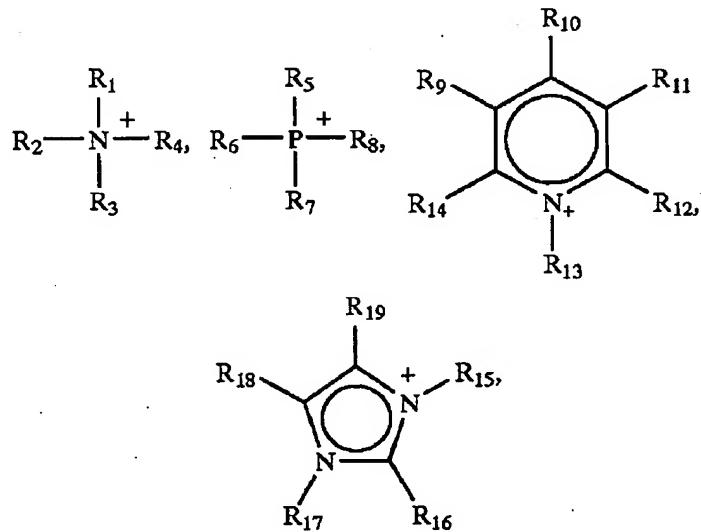
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Claim 32 (previously added): A composition in accordance with claim 31, wherein said Group IA element is hydrogen.

Claim 33 (previously added): A composition in accordance with claim 30 wherein said acid component is trifluoromethanesulfonic acid.

Claim 34 (previously added): A composition in accordance with claim 30 wherein said ionic liquid comprises a cation and an anion; wherein said cation is selected from the group consisting of ions defined by the formulas:



and combinations of any two or more thereof, wherein:

R₁, R₂, R₃, R₅, R₆ and R₇ are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule;

R₄, R₈, R₉, R₁₀, R₁₁, R₁₂, R₁₃, R₁₄, R₁₅, R₁₆, R₁₇, R₁₈, and R₁₉ are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule, and hydrogen; and

wherein said anion is selected from the group consisting of halides of: Group IIIA metals, copper, zinc, iron and phosphorus.

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Claim 35 (previously added): A composition in accordance with claim 30 wherein said mixtures of Bronsted acids and Lewis acids comprise a Bronsted acid selected from the group consisting of hydrofluoric acid, sulfuric acid, trifluoromethane sulfonic acid, and combinations of any two or more thereof.

Claim 36 (previously added): A composition in accordance with claim 30 wherein said acid component is present in said composition in a range of from about 5 weight percent to about 90 weight percent based on the total weight of said composition.

Claim 37 (previously added): A composition in accordance with claim 30 wherein said acid component is present in said composition in a range of from about 30 weight percent to about 85 weight percent based on the total weight of said composition.

Claim 38 (previously added): A composition in accordance with claim 30 wherein said acid component is present in said composition in a range of from about 50 weight percent to about 80 weight percent based on the total weight of said composition.